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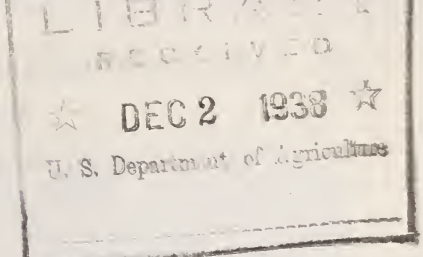
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REPORT OF THE CHIEF OF THE BUREAU OF HOME ECONOMICS, 1938

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF HOME ECONOMICS,
Washington, D. C., September 1, 1938.

HON. HENRY A. WALLACE,
Secretary of Agriculture.

DEAR MR. SECRETARY: I submit herewith the report of the Bureau of Home Economics for the fiscal year ended June 30, 1938.
LOUISE STANLEY, *Chief.*

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INTRODUCTION

The need for conserving the Nation's agricultural resources of soil, forests, and other national wealth is being recognized, and work toward this end has become increasingly important in this Department. But the Nation's resources are not limited to such things as land, trees, and minerals; they include its people, and any comprehensive conservation program must take into account the safeguarding and development of human beings. No one governmental or other social agency can do this alone. As its share in this large undertaking, agriculture helps to promote better levels of living for the Nation's families. It has fostered the production of plentiful supplies of food and of fiber. The Department's broad policies of land utilization are based upon the well-being of the whole population, not upon increased returns to farmers alone.

The Bureau of Home Economics has a unique responsibility in the Department's efforts toward conservation and development of human resources. It alone, of the several bureaus, focuses its entire program of research upon the achievement of this end. It strives to determine human needs for food, clothing, housing, and the many other goods and services that are part of our national standard of living. It endeavors to find how to use the Nation's resources most effectively in meeting these needs and in increasing human satisfaction.

Thus in working toward conservation of human values, the Bureau also serves as a link between the producer, both in agriculture and industry, and the consumer. The science of production depends for its ultimate efficacy upon the development of the science and the art of consumption. And the only measuring stick for the success of both production and consumption is their contribution to human values.

ECONOMIC STUDIES

Important to both agricultural and general welfare and fundamental to a sound agricultural program is an understanding of the kind and quality of living obtained by the Nation's families. Such knowledge helps to measure what the Nation has achieved, whether the actual levels of living of families are in accord with what we would be willing to accept as an American standard. It also helps to determine what are our production requirements if good national standards are to be reached and maintained.

A long step forward in obtaining some of the basic facts needed for a picture of levels of living of city, village, and farm families has been taken by the study of consumer purchases. This is an investigation of the expenditures and purchases of American-born families at different income levels. In this study, conducted by the Departments of Agriculture and Labor with the cooperation of the National Resources Committee, the Central Statistical Board, and the Works Progress Administration, the Economics Division of this Bureau is responsible for the work in 66 farm counties, 140 villages, and 19 small cities.

INCOMES

Family income may be considered a rough index of potential family well-being because of its close relationship to consumption patterns and to leisure for the enrichment of life. Analyses now in progress from this large-scale study show that in 1935-36 income levels of native-white families in small cities usually were higher than those of similar families living in villages and on farms. But family-income differences among geographic regions in the United States and even among communities of the same type (as cities) within a given region may be more marked than any consistent differences between city and farm, or between farm and village.

In computing the net income of farm and village families, nonmoney income in the form of home-grown food for family use, value of occupancy of owned home, and rent received as pay for services rendered, were included, as well as net money income from operating the farm or other business undertakings, from wages, and from other sources. For city families, value of home-produced food was not included in income.

By thus combining the value of farm-furnished products with money income, as a measure of total income, it was found that the families of farm operators studied in the Middle Atlantic and north-central region, and in the Pacific coast region, tended to have higher incomes in 1935-36 than did the village families in these regions. On the other hand, incomes tended to be higher among village families than among farm-operators' families in New England, and in the Plains and Mountain region of the West, where farm incomes in that year were unusually low because of the severe drought.

Median incomes rather than average incomes are used in this comparison since they present a better picture of the situation. One millionaire family might bring up a community average considerably; whereas there is no question as to the general economic situation when it is known that half the families fall above or below a certain income line.

Income figures represent only white families that included a husband and wife, both native-born, except in the Southeast where a special study of Negro families was made. The farm study was confined to families of farm operators; a special study of sharecroppers is reported separately. An operator's family must have lived for a year on the farm it was operating in order to have its income represent typical returns from farming. These restrictions tended to eliminate some of the low-income groups and thus to present a somewhat more optimistic income picture than would be given by all families in a community. In addition, the areas chosen as well adapted to a specific type of farming, as cotton or wheat, often were not typical of the State as a whole, being better farm land. Returns from these areas, therefore, were somewhat higher than the average for all farm land.

INCOMES OF VILLAGE FAMILIES

The 140 villages selected as representative of such communities throughout the country were grouped into 10 units for analysis. In five of these, median incomes of native-white families (relief and nonrelief) were above \$1.100 and in the other five, below.

The median income of the native-white, village, unbroken families in the New England region (Vermont and Massachusetts) was \$1,232. In villages of the Middle Atlantic and north-central region, median incomes of similar groups of families were: Pennsylvania and Ohio, \$1,039; Michigan and Wisconsin, \$1,086; Illinois and Iowa, \$737. Corresponding figures for villages in the Plains and Mountain region were: Kansas and North Dakota, \$916; Colorado, Montana, and South Dakota, \$1,285. The Pacific region showed median incomes of \$1,023 for Oregon and Washington, and \$1,355 for California villages. In the southeast region, median incomes of white village families were: Georgia and South Carolina, \$1,125; North Carolina and Mississippi, \$1,548. Median incomes of Negro families were \$316 and \$373, in the same groups of villages.

Although white families in North Carolina and Mississippi villages tended to have higher incomes than those in other villages studied, this fact should not be taken as an indication of greater prosperity there than elsewhere. If in all regions median incomes had been computed for white and Negro families combined, it is probable that the medians for villages in the Southeast would have been no higher than in other regions, since Negro families comprise a large proportion of the low-income population in the Southeast.

INCOMES OF FAMILIES IN SMALL CITIES

In 10 of the 19 small cities studied by the Bureau, the median income of the native-white, unbroken families was below \$1,250 a year. For two cities of industrial New England the median income of such families was \$1,347; half the families getting more, half less. For seven north-central cities the median income was \$1,164; for five Plains and Mountain cities, \$1,420; for four Pacific Northwest cities, \$1,555; and for two southeastern cities, \$1,252. For native Negro families in these two southeastern cities, the median income was \$419.

Families in which more than one worker pooled earnings to manage the group expenses ranged from a 9-percent low in Boone, Iowa, to 48 percent in Griffin, Ga. Many hands at work did not necessarily mean a greatly increased family income, as may be seen by comparing the median income of Boone, \$1,154, with that of Griffin, \$1,186.

FARM-FAMILY INCOMES

In none of the 23 farm sections chosen to represent production of the country's principal agricultural products, did more than half of the families of native-white farm operators have net yearly incomes, including both cash and kind, of more than \$1,587.

Among 543 such families in 2 Vermont counties, the median income was \$1,142. In 18 counties in 7 Middle Atlantic and North Central States—New Jersey, Pennsylvania, Ohio, Michigan, Wisconsin, Illinois, and Iowa—the highest median income, \$1,503, was found for families in Illinois. The lowest median income in this group of States, \$936, was that for families of Iowa, which was hard hit by bad crop conditions.

The ravages of the drought in 1935-36 were plainly discernible in the incomes of farm families of the Plains and Mountain region, where three separate areas were studied. Families farming North Dakota wheatlands stood at the foot of the regional list with a median income of \$593. Kansas farm families in wheat counties and the families in range livestock counties in Colorado, Montana, and South Dakota were neck and neck with median incomes of \$732 and \$731, respectively.

On the Pacific coast the lowest median income, \$1,039, was reported for Washington farm families. The highest median income, \$1,475, was found in two counties in southern California, where the chief products were fruit and nuts.

Sharpest contrasts emerged, however, not from comparisons of geographic regions but from comparisons between sharecroppers and operators, and white and Negro families in the southeast region. The situations arising out of the system of tenure in the Southeast are so different from those elsewhere that no legitimate comparison can be made between the statistics for any single color or tenure group of this region and those of other regions.

The median incomes of the families of white operators in the southeast region ranged from a low of \$611 for families in the self-sufficing farm counties of western North Carolina to a high of \$1,587 for the families in tobacco counties of eastern North Carolina.

The median incomes of the families of Negro operators ranked ahead of the median incomes of families of white sharecroppers in three of the four States studied; in the fourth, Georgia, the median income of the families of Negro operators was \$490 as compared with \$544 for the families of white sharecroppers. The median incomes for families of Negro sharecroppers ranked at the bottom of the list in every State.

Cash income of farm families.—Statistics on the net cash income of farm families are peculiarly relevant to present-day socioeconomic problems. It is the cash income that links the farm family to the economic system as a consumer of industrial products. In New England, average net cash income for the group of nonrelief farm-operators' families studied was \$789 for the year 1935-36. In the central region it ranged from a low of \$581 for Iowa farm families to \$1,202 for Illinois farm families. The drought is again evident in the figures for the Plains and Mountain region where the lowest average net cash income was \$207 for the group in North Dakota and the highest was \$874 in Colorado, Montana, and South Dakota. Cash incomes of Pacific coast farm-operators' families stood high among those for the five regions; the average of \$1,623 for 1,115 southern California farm families was at the top; that for 1,621 Oregon full-time farm operators' families, \$823, was in the upper one-half.

In the Southeast, families of white farm operators in Georgia fared worst with an average net cash income of \$449 for the year, and those in Mississippi fared best with an average of \$1,566 for 1935-36. The families of Negro farm operators had average yearly net cash incomes that ranged from \$230 to \$659, with Georgia low and North Carolina high.

Average yearly net cash incomes for the families of white sharecroppers ranged from \$203 for Georgia to \$643 for North Carolina. Somewhat lower on the scale, the families of Negro sharecroppers had net cash incomes that varied from a low of \$175 in Georgia to a high of \$523 in North Carolina.

Although the greater part of the net cash income of farm families came from farm operation, receipts from nonfarm earnings, investments, and other sources averaged 25 percent or more of the aggregate net cash income in 11 of the 20 groups of white operators studied. These average nonfarm money receipts of native-white nonrelief families of farm operators were: In Vermont, \$186; in the Middle Atlantic and north-central region, a low of \$70 in Iowa and a high of \$330 in New Jersey; in the Plains and Mountain region, a low of \$61 in North Dakota and a high of \$138 in the range livestock sections of Colorado, Montana, and South Dakota; on the Pacific coast, a range of \$256 in Oregon to \$678 in southern California; in the Southeast, \$127 in Georgia to \$307 in western North Carolina where self-sufficing farms are prevalent and provide an average of only \$87 net cash farm income. Sharecroppers, both white and Negro, reported an average of less than \$50 per family net cash nonfarm receipts. A group of families near Portland, Oreg., included in a special study of part-time farming had nonfarm money income averaging \$1,373.

Nonmoney income of farm families.—Farm families ordinarily aim for large money incomes, since they live in a money economy. However, nonmoney farm income was a factor of importance in every budget. The nonmoney farm income consisted of the value of their housing, food, fuel, ice, and other products furnished by the farm for family use, plus (or minus) the value of increases (or decreases) in crops stored for sale and of livestock. Of the average \$554 per family nonmoney income in Vermont, for example, \$510 was from farm-furnished housing, food, and other products, and \$44 from the increase in livestock and crops stored for sale.

This nonmoney income furnished by the farm for family living acquires an added significance from the fact that averages varied less than those for other kinds of income received by families of farm operators in the different sections studied. If the budgets of these farm families had any anchor to windward against economic storms, it was the certainty of some income of this type. Over the entire country the average value of farm-furnished goods received by the families of white farm operators varied between \$668 in North Carolina and \$321 in southern California.

From the average values of farm-produced food for family use it becomes clear that on the lowest threshold of farm-family subsistence it is the kitchen, garden, and the barnyard that save the day. The lower the average yearly income, the more important did supplies from these sources become. Excepting the southeast region and California, the range of the average value of such food was from \$201 in Michigan to \$367 in Iowa. In the southeast region, the range for families

of white operators was from an average of \$361 in Mississippi to \$525 in North Carolina. Averages for families of Negro operators and of white and Negro sharecroppers ranged between approximately \$100 and \$350.

These figures for value of home-produced food are based on prices the farm families would have paid had they bought food of the same quality, in similar quantities, from neighbors, or other nearby sources. Such prices are between retail and wholesale prices and thus give somewhat higher total-value figures than are customarily obtained by using prices received by farmers in wholesale markets where they sell other farm products.

CONSUMPTION PATTERNS

INCREASES IN FAMILY NET WORTH

A family's program of production for home use, its ways of spending money income, and the provision it makes for the future reflect its ideas of the kind of living the members consider most worth-while.

How much of its income a family uses for current living and how much for getting ahead financially is of especial interest in considerations of social policies relating to land tenure and to old-age security. Good money management alone does not always enable a family to balance its accounts or to save in any given year. There must be a certain minimum income, enough to stretch over its most urgent needs. While this minimum differs from family to family, depending on the number and age of its members, the size of community, and the region in which it lives, there are nevertheless fairly well-defined income limits within which families seem to be able to get ahead financially.

Of approximately 8,500 white families studied in 140 villages, the majority of those with incomes less than \$1,000 reported no change or a decrease in net worth, while the majority of those with incomes of \$1,000 or more reported financial gains during the year 1935-36.

The lowest income class in which white village families showed gains in net worth was \$1,000 to \$1,249, in the Middle Atlantic and north-central region. This dividing line was found in the \$1,250 to \$1,499 class in the Pacific and southeast regions; in the \$1,500 to \$1,749 class in the Plains and Mountain region; and in the \$1,750 to \$1,999 class in New England.

Among farm families average gains in net worth were found in the \$1,000 to \$1,249 income class (money and nonmoney income) in the areas studied in Pennsylvania and Ohio; in the income class \$1,250 to \$1,499 in Illinois and Iowa and in Kansas and North Dakota; and in the \$1,500 to \$1,749 income class in California. Families at the very lowest income levels decreased their assets or increased their liabilities to obtain the meager amount for the minimum necessary for their living. But at a fairly low level—when the net money income fell between \$500 and \$1,000—a large number of families begin to depart from a mere balancing of living expenditures with income and to apply part of their funds to paying off obligations or increasing assets. Payments on the principal of the farm mortgage and on life insurance, increased bank accounts, and investments in the farm business were quite generally the largest items in all the regions.

The increase in net worth of farm families was proportionally larger at every income level than among village or city families. Pennsylvania and Ohio farm families with net incomes of \$3,000 or more increased their net worth by an average of \$1,449, or about 43 percent of their average income, and used only a little over half for current living. In small cities in the north-central region, families at this income level spent an average of \$2,450, or about 72 percent of their money and non-money income, for family living, and devoted only an average of \$747 to getting ahead financially.

With increasing incomes, farm families apply the brake to accelerating expenditures for living far more than do city families. This tendency to an upper limit of the farm family's value of living has also been observed in previous studies and has been attributed to various causes, among them the competition between the family and the farm business (or other forms of investment) for the available income, fewer opportunities for increasing expenditures for cultural development, less tendency in the rural environment toward conspicuous consumption, and the essential democracy and lack of class distinction in a rural community. In 1935-36 the tendency towards limiting expenditures in order to pay debts may have been unusually pronounced because of debts accumulated during the depression, and in some localities because of drought.

The expenditure patterns prevailing in any community doubtless affect both the minimum spent for living, regardless of income, and the income levels where increasing net worth is preferred to spending. The data from a number of areas suggest that the point where a tendency towards an upper limit on average expenditures for living can be observed depends upon the income distribution in the community. Income distributions of Negro families are low, and both upper and lower levels of spending are below those of white families. The families of California citrus fruit growers, who had higher incomes than most of the other farm groups studied, devoted a much greater proportion of their income to family living than did families in other regions.

PATTERNS OF SPENDING FOR FAMILY LIVING

The most striking change that has taken place during the last generation in patterns of expenditures for family living is the prominence given to the automobile. Today's family must have its automobile, and when purchase of a new one is not feasible, a used car is bought to make life more livable.

In California, North Dakota, and Kansas cars were owned by 97 percent of the nonrelief native-white farm families studied. In Vermont, the percentage was 73—still almost three-fourths. Georgia and Mississippi showed 62 percent of the white farm operators having automobiles, the lowest percentage for any group of families of white operators studied.

Only in California were more new than used cars purchased by farm families. Used cars were bought about twice as often as new cars in six of the areas reported. In the east-central region, for each 1,000 families studied there were about 50 new cars and 125 used cars reported in the year's purchases. Most of the new cars bought ranged in gross price from \$600 to \$1,000. The average price of the used cars was usually well above \$200. A few used cars costing \$100 or less were bought, but usually only by low-income families.

Village families, too, have their cars. In the villages studied in the north-central region, expenditures for the family automobile were second only to food at the higher income levels. Families with incomes of \$1,500 to \$1,749 spent an average of \$13 out of every \$100 for the purchase and upkeep of automobiles. Of this amount, approximately \$7 went for car upkeep, and the remainder for purchase of new or used cars. Eighty-four out of every hundred families at this income level were car owners. The averages are based on all families, however, regardless of whether they owned cars and had expense for car operation.

In contrast to these figures are those for villages in the Southeast. There, even in the higher-income groups the automobile usually accounts for a smaller outlay than does food, clothing, housing, or running the house. In many cases expense for medical care also exceeds that for the automobile. The two regions are similar, however, in the increasingly important place occupied by the automobile as income rises.

The automobile seems to be virtually the sole means of transportation for village families. Average annual expense for other travel and transportation was below \$10 for nearly all groups, and in the majority of occupational and income classes was under an average of 50 cents a month.

The house of a city family often is taken as an index of its economic situation. This is less true in farm areas, where number of acres, fences, barns, and other evidences of prosperity are available. However, kind of housing does give some indication of levels of comfort achieved. Among the families of white operators in the \$1,000 to \$1,249 income class, the size of house—the average number of rooms—ranged from 5.5 in California to 9.5 in Vermont. The percentage of homes with hot and cold water in kitchen and bath ranged from 5 percent or less in the Southeast to 75 percent in California. The farmhouses on the west coast tended to be smaller than northern houses, but more of them were equipped with facilities making for comfortable living. Although the farm family may spend less than the city family for its housing, it may obtain less in the way of running water, electric lights, central heating, and other facilities that add to comfort and save labor.

In villages one-family houses predominate. Home owners outnumbered renters in half of the village groups studied. The percentage of white families that owned their homes varied from 38 in Georgia and South Carolina to 56 in Michigan and Wisconsin. Among the Negro families in the southeastern villages, about one out of every three occupied an owned home, a proportion smaller than among any group of white families.

As a general rule, home ownership in small cities was more frequent at income levels of \$1,500 and more than in those below. As the income level rose, the amount spent for rent increased, though less rapidly. Two-family houses and apartments were more often found in northeastern industrial cities than in other regions. In agricultural marketing centers and in industrial cities in the Central West, the one-family house was the usual American home.

An adequate supply of suitable food is important for healthful living. A study of the diets of families of employed wage earners and low-salaried clerical workers in cities showed that from the standpoint of nutrition, diets stood in need of improvement in the case of 40 to 60 percent of the white families in four regions and in the case of more than 60 percent of the Negro families in the South. None of these families had been on relief during the previous year and all of them had had incomes of at least \$500. These figures regarding city diets are corroborated by data concerning the diets of nonrelief families covered by the consumer purchases study. This study paints an even darker picture for village than for city families, but a much brighter one for farm families.

With the dietary habits and retail food prices current in 1935, the year in which the dietary study was made among wage earners, there was a level of food expenditures (different for each region) above which families were able to purchase adequate diets. About 10 percent of the diets classed as good were actually purchased by families for less than the following amounts per person per week:

White families living in—	
North Atlantic cities.....	\$2. 75
East North Central cities.....	2. 70
East South Central cities.....	2. 15
Pacific cities.....	2. 60
Negro families living in southern cities.....	1. 90

The expenditure levels below which 10 percent of the good diets were purchased may perhaps be taken as a reasonable yardstick of minimum cost of a good diet in the different regions. They cover, with a little leeway for some food groups, the cost of a fully adequate food budget. The proportion of families, region by region, spending as much as or more than the stated sums was white families living in the North Atlantic region, 51 percent; East North Central, 45; East South Central, 50; Pacific, 60; and Negro families living in the Southern region, 32. However, not all families spending enough to buy fully adequate diets succeeded in getting them. Of every 10 white families spending enough, only 2 to 4 selected good diets. Among Negro families in the South, the proportion was a little over 3 out of 10. These figures point to the need both for increased purchasing power on the part of urban groups, and for more widespread education in nutrition and in over-the-counter food buying in order to help them make the most of their money resources for food.

Families of moderately well-to-do city wage earners whose diets rated "good" from the standpoint of nutrition bought more eggs, from 50 to 100 percent more milk, and more than 50 percent more fruit and vegetables than the average for this population group. These foods are sometimes called "protective foods," because they are especially rich in certain nutrients of which a shortage is frequently encountered. But urban families often find them expensive to buy. Their purchases of just these items increase greatly when their purchasing power is improved. To supply these increased quantities of food—which city families would like to buy had they sufficient income—would mean greatly increased production on the part of farms.

The better-than-average diets enjoyed by farm families may be attributed in large part to their programs of food production for family use. The amount, kind, and value of farm-furnished food vary with the region and type of farming.

The average value of home-produced fruits and vegetables used by families of farm operators exceeded \$75 in about one-half of the areas included in the consumer purchases study. Milk and cream furnished by the farm to the family had an even higher value; the average exceeded \$100 in more than three-fifths of the areas. Families used enough poultry and eggs from the farm that in three-fifths of the areas the average value exceeded \$50.

The value of food furnished by the farm for the family table might be expected to remain at a constant level, independent of the family income. However, this is not the case. It increased with income. Because of limitations of the family's capacity to consume, there is an upper limit to the value of home-produced food that can be used; but this is not reached until the income is relatively high.

Most farm families lack some of the freedom of choice enjoyed by the urban, whose income is largely in the form of cash. However, by looking ahead and

making a moderate outlay of cash, land, and labor, many can add to their money income an income "in kind" that contributes richly to a good table and to good health.

FOODS AND NUTRITION

The general well-being of the human race is determined in large measure by its food habits. To this extent, the use of a diet containing adequate amounts of all the food essentials is an important factor in health. A large share of many family budgets goes for food, and for this reason, too, it is important that food be so selected and prepared as to yield the highest possible returns in good nutrition at different cost levels.

NUTRITIVE NEEDS OF MAN

The current research program is centered on the nutritive needs of man. In considering these requirements, it is necessary to study all factors that influence the way the human body utilizes essential nutrients. For many years our requirements for food energy, protein, and the more important mineral elements have been recognized. Recently, a great deal of scientific interest has been directed to the physiological importance of the vitamins, and to studies that would ascertain how much of each vitamin the body needs daily.

A study of the adult requirement for vitamin A has therefore been inaugurated. In order to determine the vitamin A requirements of man, it is necessary to have a basis for distinguishing between nutritional states of adequacy and inadequacy of this vitamin. Of the several recognizable signs of vitamin A deficiency, it now seems that nutritional night blindness, or the inability to see well in dim light, is the earliest to appear. There are several instruments for testing the presence or absence of night blindness in human beings. A number of human subjects were tested and an instrument known as the visual "adaptometer" was found to be reliable and accurate in measuring small differences in sensitivity to dim light.

The adaptometer was then used in a detailed study of the vitamin A requirements of humans, in which five normal, well-nourished adults served as subjects. During the experiment, which lasted nearly 6 months, the subjects ate only food that was prepared and weighed in the laboratory kitchen. This diet was planned to provide an abundance of all the known nutritive essentials with the exception of vitamin A, which was present only in very limited amounts. The subjects were tested frequently with the adaptometer, and after intervals of time varying from 2 to 6 weeks they showed impaired dark adaptation. These individual differences are explained by the fact that each person had a different amount of vitamin A stored in his liver, depending in part on his diet previous to the beginning of the experiment.

When the dark adaptation had changed so that it was requiring 10 times as much light for the subject to see in dim light as when he was normal, vitamin A was added by giving biologically assayed cod-liver oil, which was carefully weighed into gelatin capsules. Small amounts were given daily at first and these were increased slowly until the dose of cod-liver oil was reached that would just return the dark adaptation to normal. As might be expected, the dose required was different for each individual; it varied from 1,300 International Units a day for the smallest to 3,900 for the largest. This figure included the small amount of vitamin A in the diet as well as that in the cod-liver oil. Even when the size of the person was taken into consideration, there was still a difference in the amount of vitamin A necessary for individuals. The minimum requirement varied between the limits of 25 and 56 International Units per kilogram of body weight.

Because in low-cost dietaries the main source of vitamin A is the carotene of leafy, green, and yellow vegetables, the study of human requirements was continued using carotene instead of cod-liver oil to provide adequate vitamin A. It was found that the amount of carotene required to restore normal vision in dim light varied from 43 to 103 International Units per kilogram of body weight. The carotene was only about 60 percent as efficient as vitamin A from fish-liver oil in providing for the vitamin A requirements of adults.

Even this efficiency of carotene will not be attained unless significant quantities of fat are present in the diet. Furthermore, the fats commonly used as food differ somewhat in their ability to promote the assimilation of this substance. For these reasons it is planned to investigate both the kinds and the

quantities of food fats that will bring about the best utilization of carotene. The properties of fats that may account for these nutritive differences are also being studied.

In recent years notable strides have been made in isolating and chemically identifying the different vitamins. However, the components of the vitamin B complex are still not clearly defined. A study now in progress deals with the fractionation of the vitamin B complex in rice polishings. It has resulted so far in establishing the means of preparing very potent concentrates of at least two unidentified vitamins in rice polishings. These concentrates have been found to be very effective in promoting growth in experimental animals and in preventing the development in them of a specific type of dermatosis. These concentrates, the most active of which are highly crystalline, are distinct from thiamin and riboflavin.

Consumers are constantly asking for information about the vitamin content of commercially canned foods, such as tomato juice. A study to compare the vitamin C content of commercially canned tomatoes and tomato juice showed both to be good sources of vitamin C (ascorbic acid), even though there was variation in ascorbic acid content from can to can of the same brand and from brand to brand. The samples of canned tomatoes varied less in ascorbic acid content than did the canned tomato juice.

Studies on the vitamin C content of home-canned tomatoes show that there was no loss of vitamin C under the processing methods used. Home-canned tomatoes stored for 6 months at ordinary room temperature suffered 30 to 50 percent loss of vitamin C.

Commercially canned tomato juice and fresh orange juice stored in the refrigerator below 45° F. for 2 to 3 days showed no appreciable loss of ascorbic acid.

Carrots and spinach (both raw and cooked) were assayed to determine losses in vitamin A and in vitamin B₁ (thiamin) due to the effects of heat and oxidative processes. The results indicate that, provided the vegetables are not overcooked, practically all of the vitamin B₁ value is retained in the cooked vegetable and cooking water. However, since appreciable quantities of thiamin are recovered in the cooking water, it is important that this juice be served along with the cooked vegetable.

Studies on vanadium, one of the trace elements, are being pursued in order to determine whether it is a necessary constituent of the diet. The results show that moderate quantities of vanadium in the diet of experimental animals (12 to 25 parts per million of the diet) are tolerated without any gross symptoms. Above 100 parts per million the vanadium is toxic, and with 400 parts per million many of the animals die.

The United States Public Health Service cooperated with the Bureau in studying the effects of these toxic doses of vanadium upon the various tissues. Outstanding was the finding of an acute inflammation in the intestinal tract, often accompanied by ulcers. Most of the animals showed hemorrhages in the lungs, destruction of liver tissue and bone marrow, and an abnormally small spleen, the blood content of which had been definitely decreased. The brain and cord often showed congestion in the early stages. As is the case with some toxic elements, there was no cumulative effect from feeding vanadium daily over a long period, provided the lethal dose was not exceeded at any one time. Spectrographic analyses are now in progress to determine the distribution of vanadium in animal tissues, as a step towards a better understanding of the physiological function of this element.

FOOD COMPOSITION

The preparation of tables on food composition for general use in calculating or planning diets or in evaluating foods is nearing completion. The list contains more than a thousand items for which protein, fat, carbohydrate, and caloric values will be given.

Summarized data on calcium, phosphorus, and iron in cabbage, lettuce, and spinach indicate that the very green leaves are the richer in calcium and iron. Green cabbage, either savoy or the green, nonheading varieties, is apparently the richest of these three vegetables in calcium, but spinach excels in total iron. These studies have considered only the total amount of calcium and iron present in the vegetables and have not taken account of any differences in the way the body utilizes these elements from different sources.

UTILIZATION OF FOOD

The quality of the family diet depends not only on the kinds of food that are selected but also on the ways in which foods are processed and prepared. To round out its program in foods and nutrition, the Bureau therefore studies the principles and methods of food preparation and preservation, and the effect of these different methods on food quality.

Studies previously reported showed that the diet of the hen, season of the year, and the period in the laying cycle have no effect on the leavening power of the egg whites in sponge-type cakes. Some market eggs are characterized by very thin whites. To test the value of these so-called watery whites as a leavening agent, the foams from whole normal whites, from mechanically separated thin whites, and from firm whites were compared. These were further tested in angel-food cakes, with the following tentative results: The cakes made from the thin egg whites were less soft and elastic, tougher, and had less volume than those made from the whole and the firm whites.

The influence of consistency of fat on its shortening value has been studied with lards, hydrogenated fats, compound, margarines, and butter in pastry squares and modified shortbread. Significant differences in breaking strength were found for some of the fats when the products are mixed at 22° C. Tests are now being made at other temperatures.

The study of meat quality has been continued in cooperation with the Bureaus of Animal Industry and Agricultural Economics, and several State agricultural experiment stations. About 450 cuts from experimental cattle, lambs, and hogs were cooked by standard methods and judged for palatability. The meat samples represent animals used in studies of such production factors as breed, sex, age, and feeding, and of various methods of curing, ripening, and storing the meat.

In the cooperative study of poultry quality 185 turkeys and 20 frozen chickens were cooked and judged for ration and storage experiments.

Tests were conducted in cooperation with the Bureau of Plant Industry to determine the relationship between the specific gravity of potato tubers and their mealiness when cooked. If the specific gravity is a sufficiently reliable index of mealiness, it is believed this method could be used in the studies for selection of varieties of high cooking quality, rather than the more involved cooking tests. The study of the effect of spacing and depth of planting of potatoes on the quality of cooked potatoes was continued for a second season. No significant relationship was found between excess potash in the soil and after-cooking blackening of potatoes.

As part of a varietal selection study of soybeans, also cooperative with the Bureau of Plant Industry, 68 varieties of green vegetable soybeans were cooked and judged for quality. Kura, Aoda, Higan, and Willoni tested for 4 successive years showed consistently good quality. Others showing good quality are Rokusun, Bansei, Hahto, and Shiro. The Hahto, Rokusun, and Aoda varieties had better eating quality when gathered at the prime stage. Hakkards and Jogun were equally good when preprime or prime, while the Kura beans were good at all three stages.

The investigational work in canning was confined to a study of adequate processing periods for meat. Of the 1,600 cans to be packed in No. 2 and No. 3 cans, the 1,035 finished have included parboiled beef, beef exhausted in the can, beef hamburger, parboiled pork loin, and pork sausage, all in No. 2 tin cans. For each kind of pack, part of the cans were inoculated with a putrefactive anaerobic bacterium, designated by some bacteriologists as type C *Clostridium botulinum*. The organism produces gas but no toxin. All cans were processed in a steam-pressure cooker at 250° F., for varying periods, and are being stored for 6 months at 95° to 98°.

TEXTILE AND CLOTHING RESEARCH

Realizing the great need of definitions as guides to buying and of "landmarks" by which consumers can judge values within a given class of fabrics, the Bureau is studying the fabrics on the market and suggesting minimum specifications for various classes of textiles and for different grades within each class. Data thus obtained on broadcloth, toweling, and sheeting were used this year by the American Society for Testing Materials in recommending tentative specifications for these fabrics.

TERRY TOWELS

Terry towels, articles bought by every household, vary tremendously in construction and, therefore, in the amount of service they give. Such articles bear no labels that give any information concerning relative values and even classifications are lacking that will inform consumers of the variation in the types they are buying. Bottom qualities are now suggested, below which such a fabric should not be called a terry towel—thus eliminating from the market qualities so poor as to be worthless as a towel. This definition is based on these specifications: Terry toweling shall be a cotton fabric covered with loops on both sides and requiring in its construction two sets of warp and one of filling yarns. The ground-warp yarns shall be either single or double ply; the number of yarns per inch shall be not less than 22 in the ground, 26 in the pile, and 26 in the filling; the breaking strength shall be not less than 18 pounds warpwise and 30 pounds fillingwise (strip method); and the weight shall be not less than 8 ounces per square yard.

Four types for which breaking-strength values are proposed, vary from 18 to 44 pounds in the warp. It is also recommended that the type be designated on towel labels and minimum specifications are proposed as to number of yarns per inch, weight, and breaking strength for each type so that the consumer will have definite facts on which to base her selections.

A serviceability study has been completed on four groups of towels representative of two of these constructions, namely, double-loop towels with single-ground warp yarns and single-loop with double-ply ground-warp yarns. With increasing service, the breaking and bursting strengths of all four qualities of towels decreased while the chemical deterioration as measured by fluidity in cuprammonium hydroxide, copper number, and methylene blue absorption increased. For each construction of towels the quality that originally showed more chemical deterioration continued to do so throughout service. Warpwise, the double-ply towels had a higher breaking strength after 100 washes than did the single-yarn towels when new. Throughout the study the double-ply towels were heavier and stronger than the single-yarn towels, and showed no excessive chemical damage. It was apparent that they would give greater satisfaction to the user than the single-yarn towels.

SHEETING

The names of even staple fabrics mean little today. For example, when the word "percale" was first applied to sheeting, it meant a very fine fabric of combed yarns with at least 100 warp yarns and 100 filling yarns per inch. In order to profit by the luxury appeal of this fine fabric, gradually coarser and coarser sheetings of cheaper carded yarns were put on the market under such names as "utility percale" or just "percale" and sold to unsuspecting consumers who associated the name with its original use.

As a result of its studies, the Bureau recommends that consumers recognize five distinct classes of sheets: Three weights of muslin (heavy, medium, and lightweight), percale, and a coarser sheet of approximately the same weight. The following definitions of each, based on minimum specifications are suggested: Grade A (heavy muslin), a fabric of carded yarns, with a minimum of 74 warp yarns and 66 filling yarns per inch, a minimum weight of 4.6 ounces per square yard, and a minimum breaking strength of 70 pounds; grade B, a mediumweight muslin, also a fabric of carded yarns with a minimum of 68 warp yarns per inch and 60 filling yarns per inch, a minimum weight of 4.2 ounces per square yard, and a minimum breaking strength of 60 pounds in the warp and 50 pounds in the filling; grade C, the coarsest (a lightweight muslin), a fabric of carded yarns with 56 yarns per inch both warpwise and fillingwise, a minimum weight of 3.9 ounces per square yard, and a tensile strength of 50 pounds in the warp and 45 pounds in the filling.

It is further recommended that the word "percale" be reserved for the sheeting of the finest yarns and highest yarn count—a fabric of combed yarns with a count of not less than 200 yarns to the inch (warp plus filling), a maximum weight per square yard of 4 ounces, and a minimum breaking strength of 60 pounds. The coarser fabrics of similar weight and somewhat lower breaking strength made of carded instead of combed yarns might well be given some other name so they will not be confused with percales. "Muscale" is suggested.

Additions were made to the knowledge of the serviceability of such materials by a study of sheetings made from two selected mill types of cotton. This study, in cooperation with the Bureau of Agricultural Economics, was made on heavy muslin sheetings manufactured from a cotton designated as A, which ranged from Middling Light Spotted to Strict Middling Spotted in grade and from 15/16 to 1 inch in staple length, and one designated as B, which ranged from Middling to Strict Middling in grade and from 31/32 to 1 1/16 inches in staple length.

All the physical and chemical tests measuring damage showed in general that the fabric made from cotton A was more deteriorated originally and throughout use than the material made from cotton B. Wear had more effect on the physical than on the chemical properties of the sheets. For example, after 250 washes, the physical values of the sides that received the minimum wear were similar to those of the center section after 200 launderings while the chemical values of the sides of the 250-wash sheets approximated those of the center after 225 times washed.

The length of service as measured in units of 1 night's use and of one laundering of the cotton-A heavy-muslin sheeting was 281 periods and cotton B, 276 periods. It is evident that the difference in the deterioration of the two cottons was not great enough to affect the serviceability of the resultant fabrics. When mediumweight muslin sheets were made from 1-inch staple cotton, the sheets made from cotton of Good Middling grade were serviceable for 237 periods and those from Middling cotton for 239 periods. The Bureau's studies made so far on sheeting show that the construction of the fabric affects serviceability more than does the grade of the cotton.

BROADCLOTH

Broadcloth is another fabric that has been lowered in quality until the word means nothing at the present time. An analysis of a great variety of fabrics sold as broadcloths discloses that constructions vary from those originally associated with the word to fabrics more like muslin than broadcloth. The following definition for cotton broadcloth is therefore proposed: It shall be a plain-woven, bleached, cotton fabric. The yarns shall be either carded or combed, and there shall be approximately twice as many warp as filling yarns per inch. The number of yarns per inch shall be not less than 100 warp and 54 filling; the breaking strength shall be not less than 56 pounds warpwise and 20 pounds fillingwise (grab method); and the weight shall be not less than 3.0 ounces nor greater than 4.0 ounces per square yard.

All the broadcloths on the market can be classified in four distinct types or classes. Consumer satisfaction with these fabrics would be increased if minimum specifications were set up for each of these and broadcloth fabrics and garments marketed on the basis of type. The specifications suggested are as follows:

Type 1 (low-count single broadcloth, carded, unmercerized). Minimum number of yarns per inch 100 warp and 54 filling, minimum weight 3.0 ounces per square yard, minimum breaking strength (grab method) 56 pounds warpwise and 20 pounds fillingwise.

Type 2 (high-count single broadcloth, carded or combed, usually mercerized). Minimum number of yarns per inch 132 warp and 58 filling, minimum weight 3.1 ounces per square yard, minimum breaking strength (grab method) 76 pounds warpwise and 24 pounds fillingwise.

Type 3 (mixed-ply, two-ply warp with single filling yarns, combed, and mercerized). Minimum number of yarns per inch 110 warp and 56 filling, minimum weight 3.0 ounces per square yard, minimum breaking strength (grab method) 90 pounds warpwise and 24 pounds fillingwise.

Type 4 (double-ply, two-ply yarns in both warp and filling, combed, and mercerized). Minimum number of yarns per inch 146 warp and 72 filling, minimum weight 3.1 ounces per square yard, minimum breaking strength (grab method) 90 pounds warpwise and 32 pounds fillingwise.

In this connection, a study is being made of 35 shirts, ranging in price from 69 cents to \$5 and made of broadcloth, madras, chambray, oxford, covert, and jean. They are tested for weight, thickness, yarns per inch, breaking strength, shrinkage, and effect of abrasion. In the cheap broadcloth shirts so far analyzed, the material was the type here defined as type 1; medium-priced broadcloth shirtings corresponded to type 2; while those in the upper range

were of type-4 fabric. The material defined as type 3 frequently goes into uniforms, but seldom into business shirts.

The fillingwise breaking strength was used to rate the fabrics because worn shirts show that the filling yarns are the first to break in actual wear. Results of tests on the new shirts show that among these particular samples, oxford had the greatest fillingwise strength. Chambray, madras, and 2 by 2 broadcloth had about equal strengths. Type-2 and type-1 broadcloths were lowest, type 2 being stronger than type 1.

On the other hand, considering the percentage of change in breaking strength in the fillingwise direction after the material has been desized and abraded, oxford shows the greatest change, then chambray, and madras. All types of broadcloth show the least change.

UPHOLSTERY FABRICS

Upholstery fabrics are another class of textiles that, under present merchandising practices, with their lack of specifications or grading system, must be bought by guess. Oftentimes, moreover, these materials are already nailed to furniture frames so that the buyer cannot even examine the back of the fabric or gain the slight bit of information that ordinarily can be obtained by feeling the fabric or holding it up to the light. The initial high price of upholstered furniture and the cost of replacing worn-out coverings often make this a particular hardship to consumers.

As a basis for proposing minimum requirements for different types of upholstery fabrics, an analysis was made of 62 samples divided into five classes: Rib weaves, damasks and brocades, friezes, velvets, and novelties. Minimum requirements are recommended for two grades of each of the first three groups. These requirements cover the weight per square yard and the breaking strength, both warpwise and fillingwise, of the cloth before and after it had been abraded 10,000 rubs under 3 pounds pressure and 2 pounds tension. The number of tufts per square inch and the weight of pile per square yard were also included for the pile fabrics.

These proposed requirements for upholstery fabrics have recently been published and are being studied by the trade with great interest.

BLANKETS

With a view to suggesting guideposts helpful in buying blankets, various qualities offered in the retail market were studied and a classification suggested based on fiber content with minimum specifications for two classes of all-wool blankets and two of all-cotton, one for cotton warp-wool filling, and one for blankets containing between 5 and 25 percent of wool.

It is proposed that all-wool blankets have at least 24 yarns warpwise and 16 fillingwise. Lightweight all-wool blankets should weigh at least 8.4 ounces per square yard, have a minimum breaking strength (grab method) of 20 pounds warpwise and 12 fillingwise, a minimum thickness of 0.090 inch, and should not allow more than 180 cubic feet of air to pass through 1 square foot in 1 minute at a pressure difference of 1 pound. Heavyweight all-wool blankets should weigh at least 12 ounces per square yard, have a minimum breaking strength of 30 pounds warpwise and 20 pounds fillingwise (grab method), a minimum thickness of 0.120 inch, and should not allow more than 130 cubic feet of air to pass through 1 square foot of blanket in 1 minute at a pressure difference of 1 pound.

Blankets having a cotton warp and a wool filling should weight at least 9.4 ounces per square yard, have a yarn count of 30 warpwise and 28 fillingwise, a minimum breaking strength (grab method) of 30 pounds warp and 20 pounds filling, a minimum thickness of 0.090 inch, and a maximum air permeability of 130 cubic feet.

In cooperation with the Bureau of Animal Industry an investigation is being carried on of the use value of various qualities of American-grown wools. First a service study was made on blankets from different qualities of new wool and reworked wool, a new wool fabric of one-half-blood fineness that met the proposed requirements for heavyweight wool blankets was still in good condition after 52 periods of service. The blankets tested were used in a postoperative hospital ward and the number of launderings was considered as a measure of the amount of service. Another fabric of 1 part new three-

eights-blood wool and 2 parts reworked wool that met the proposed requirements for lightweight wool blankets was serviceable for 36 periods.

The work is being continued with heavyweight blankets made from good three-eighths-blood Idaho wool, combined with varying amounts of good and poor quality reworked wool. Blankets of each lot, of different composition, have been withdrawn after 12 periods of use and laundering, and the resultant deterioration is being measured by physical and chemical methods of analysis. These include such tests as those for heat transmission, air permeability, breaking strength, sulphur and nitrogen content, and fiber-scale breakage.

As part of the tests on the serviceability of blankets, a study is also being made in cooperation with the Bureau of Plant Industry, of the role of micro-organisms in the deterioration of such materials, and methods are being developed for sterilizing wool fabrics without damaging the fibers. Blankets, clothing, and other articles must be sterilized after contact with contagious diseases. Heretofore, any process that killed the micro-organisms did considerable damage to the material itself. New methods are needed.

The micro-organisms used in this work are *Bacillus mesentericus*, the spore-forming test organism, and the disease organisms *Staphylococcus aureus*, *Epidermophyton curis*, *Trichophyton interdigitale*, and *Mycobacterium tuberculosis*, which cause boils, ringworm, athlete's foot, and tuberculosis, respectively. The methods that have proved most successful are heating in xylene, Stoddard's solvent, or tetrachlorethylene. At present the effect of adding such chemicals as acetic acid and sodium chlororthophenylphenate to these solvents and of using formaldehyde gas alone is being investigated.

CLOTHING SIZES

Children's clothing and patterns are sized on a basis of age, but it is becoming more and more apparent that these age designations have little or no relationship to the dimensions of children. Garments bearing the same age markings, but coming from different manufacturers, rarely have the same dimensions, and most of them are too small for children of the age specified.

In order to provide the facts upon which better garment sizing may be based, the Bureau has undertaken the leadership in a cooperative study of the body measurements of children 4 to 14 years of age. This was made possible through the allotment of funds by the Works Progress Administration and through the cooperation of the National Youth Administration.

This project has been carried on in cooperation with the following institutions: University of Alabama, University of Iowa, Kansas State College, University of Minnesota, Pennsylvania State College, Agricultural and Mechanical College of Texas, Texas State College for Women, North Texas State Teachers College, Texas Technological College, Colorado State College, University of Colorado, University of California, Chicago Normal College, Detroit public schools, Cincinnati public schools, University of Tennessee, Utah State College, University of Utah, and the Omaha public schools. The Bureau has been in direct charge of the work in the District of Columbia and in Maryland.

The measurements taken are those of greatest importance in the construction of patterns and clothing, and number 36, including weight. Ninety thousand boys and girls from different economic levels have been measured to date.

Since experience seems to show that age is a very unsatisfactory basis for the sizing of garments and patterns, and it is neither necessary nor practical to size them on the basis of all the 36 measurements, an effort is being made to determine statistically from the data collected, which one measurement or combination of measurements will best serve this purpose. As a preliminary study, the search for such key measurements was undertaken on the basis of two samples of 16,000 children—approximately 8,000 boys, and 8,000 girls. These two samples were tabulated and the necessary statistical quantities were calculated.

This preliminary analysis shows that age is a poor criterion of body dimensions and hence an unsatisfactory basis for sizing. The four measurements from any one of which the other measurements can best be predicted and which, therefore, would be the most satisfactory as a basis for garment sizes are weight, girth of hips, oblique trunk girth, and stature. An even better basis for sizing would be a combination of two measurements. The best combinations of two, as

shown by the data collected to date, are stature and girth of hips; height of waist and girth of hips; height of waist and weight; and stature and weight.

Combinations of three measurements were also tried to see whether they would serve as a good basis for sizing. The best of these are height of waist, girth of chest, and girth of hips; stature, girth of chest, and girth of hips; height of waist, weight, and girth of hips; and stature, weight, and girth of hips. However, as far as the measurements taken to date show, a combination of two is sufficient to use as a basis for sizing. Including a third one does not substantially add any more information or give a more accurate prediction of the other dimensions. Before any final recommendations are made, these results will be verified by the analysis of all the data when the measuring is completed.

COTTON-FABRIC FINISHES

The finishing of cotton fabrics has become increasingly important to consumers. The usefulness of such fabrics can be greatly enhanced by special treatments, making them more resistant to soiling, creasing, and wrinkling, as well as providing a means of restoring their original appearance after laundering. The continued study of gelatin and starches used in textile sizing shows that the strength of starch films depends on their thickness and not on the kind of starch. However, starch films differ considerably in total elongation and folding endurance. Potato-starch films and fabrics sized with potato starch stretch the most. Then come canna starch, sweetpotato, rice, wheat, dasheen, and corn, in the order named. Canna and potato starches have the greatest folding endurance and wheat and dasheen the least.

HOUSING AND HOUSEHOLD EQUIPMENT

The increased availability of bottled gas and of electricity has made possible new forms of labor-saving equipment to farm as well as urban families. These long-desired conveniences coming at a time when cash incomes are limited have presented to farm families new problems in budget planning. Not only must expenditures for equipment find their place in the family budget, but choices of fuels, the kinds of equipment the family needs most, and the types best adapted to their particular requirements and pocketbooks, all must be considered. Homemakers are therefore asking for information to guide them in selecting equipment, as well as on its efficient use and care.

From the study of different fuels used for cooking, made in cooperation with the Bureau of Agricultural Engineering, the following conclusions have been reached: The amount of fuel consumed in cooking depends not only on the fuel but on the design of the range, the kind and size of utensil, and the menu. The comparative efficiency of fuels must also be based on data from both surface burners and oven cookery. In the studies conducted on given ranges and cooking utensils with meals chosen to represent as many typical cooking processes as possible and involving both the surface burners and the ovens, electric ranges proved to be almost three times as efficient as gasoline and kerosene, about twice as efficient as manufactured gas, and about one and four-fifths as efficient as bottled gas. The comparative speeds of the fuels tested were not the same as the efficiency of the fuels. For the 18 meals cooked in the laboratory (surface and oven), bottled gas proved to be the fastest. For surface cooking only slight differences in speed were found between different fuels. Manufactured gas had a slight advantage over all others, while kerosene was the slowest of the five fuels tested. Comparative costs for this particular set of meals cannot be used for estimating monthly or yearly costs of any given fuel even though the average rate paid for that fuel in this country can be determined.

To secure valid figures on average comparative costs of different fuels, laboratory studies must be supplemented with field studies in order to determine the actual consumption of the various fuels in different sections of the country, with varying climatic conditions and at different seasons of the year, by families of different sizes and of different types of racial, social, and economic backgrounds.

PUBLICATIONS AND INFORMATION SERVICES

By printed word, spoken word, picture, and exhibit, the results of the Bureau's work are made known to the public as soon as a project reaches completion. The list of bulletins and journal articles for the past year includes 27 titles representing material adapted to the use of homemakers and specialized research groups:

DEPARTMENT PUBLICATIONS

- Farm family living outlook for 1938 (in cooperation with Bureau of Agricultural Economics). Misc. Pub. 297.
- Methods and equipment for home laundering. By R. O'Brien and H. S. Holbrook. Farmers' Bull. 1497, rev.
- Fabrics and designs for children's clothes. By C. L. Scott and M. Smith. Farmers' Bull. 1778.
- Nuts and ways to use them. By E. F. Whiteman. Misc. Pub. 302.
- Home-made jellies, jams, and preserves. By F. W. Yeatman and M. C. Stienbarger. Farmers' Bull. 1800.
- When a woman buys a coat. By C. L. Scott. A pictorial supplement to Leaflet 117.
- Apple recipes. Unnumbered pub.
- Soybeans for the table. By E. F. Whiteman and E. K. Keyt. Leaflet 166. (In press.)
- Dry skim milk. Unnumbered pub.
- Family living in Knott County, Ky. By F. M. Williams, H. K. Stiebeling, I. G. Swisher, and G. S. Weiss. Tech. Bull. 576.
- The sterilization of wool and its effect on physical and chemical properties of a woolen fabric. By H. Humfeld, R. E. Elmquist, and J. H. Kettering. (In cooperation with Bureau of Plant Industry.) Tech. Bull. 588.
- Proposed minimum requirements of 3 types of upholstery fabrics based on the analysis of 62 materials. By B. V. Morrison and M. B. Hays. Circ. 483.
- Food consumption of children at the National Child Research Center. By H. N. Hann and H. K. Stiebeling. Circ. 481.
- Factors to be considered in preparing minimum-wage budgets for women. By G. S. Weiss, M. Waite, L. Stitt, and S. Stewart. (In cooperation with Women's Bureau and Bureau of Labor Statistics, Department of Labor.) Misc. Pub. 324. (In press.)
- Diets of families of employed wage earners and clerical workers in cities. By H. K. Stiebeling and E. F. Phipard. Cir. 507. (In press.)

ARTICLES IN OUTSIDE JOURNALS

- The food bill of American families. By H. K. Stiebeling. Agr. Situation 21 (7): 16-17. July 1, 1937.
- Obtaining a panel for judging flavor in foods. By F. B. King. Food Research 2 (3): 207-219, illus. 1937.
- The reactions of three all-wool blanket fabrics to three types of laundering. By R. E. Elmquist and M. B. Hays. Amer. Dyestuff Repr. 26: 469-476, illus. August 9, 1937.
- Labels that mean something. By R. O'Brien. Bull. of Natl. Retail Dry Goods Assoc. 19 (9): 70. September 1937.
- Weights of food materials used in food preparation. By E. F. Whiteman and F. B. King. Jour. Home Econ. 29: 641-644. November 1937.
- Cooked meats and poultry classified by chemical composition. By C. Chatfield. Jour. Amer. Dietetic Assoc. 13: 312-319. November 1937.
- Some previews of an analysis of American diets. By H. K. Stiebeling. Medical Woman's Jour. 44: 313-317. November 1937.
- Levels of living of the nation's families. By D. Monroe. Jour. Home Econ. 29: 665-670. December 1937.
- A consumer classification and specification for cotton Turkish towels. By M. B. Hays. Rayon Textile Monthly 19 (4): 85-86, 112, illus. April 1938.
- Experimental vanadium poisoning in the white rat. By E. P. Daniel and R. D. Lillie. (In cooperation with the U. S. Public Health Service.) Pub. Health Repts. 53: 765-777, illus. May 13, 1938.
- A service study of four qualities of cotton Turkish towels. By R. E. Rogers and M. B. Hays. Jour. Home Econ. 30: 406-412, illus. June 1938.
- Turkish towels and specifications. By M. B. Hays. Jour. Home Econ. 30: 395-396. June 1938.

Approximately 100 press releases based on data from the consumer purchases study have been widely used in newspapers and trade journals and have stimulated editorial comment and formed the basis for many interpretive articles.

An increasing number of extension workers are using the weekly Market Basket release reporting new developments in foods and nutrition as the foundation for local articles. Metropolitan dailies also run this material regularly in their pages for women readers.

Since January 1938 the National Farm and Home Hour radio program has been carried by a network of 93 stations with coast-to-coast coverage. In cooperation with the Radio Service of the Department, a representative of the Bureau speaks each week on this program, thus keeping homemakers currently informed of the ways in which science can serve them in the daily running of the household. Listeners to 50 of these 7-minute broadcasts wrote 85,875 letters to the Bureau requesting bulletins and asking specific questions on a variety of subjects affecting the health and well-being of the family.

To let professional home economics workers and teachers know of available source material, mounted sets of the latest bulletins and the charts on clothing selection, nutrition, and meat cookery, were circulated to 62 State and regional conferences. During the annual meeting of the American Home Economics Association thousands of visitors came to the Bureau's booth to look over publications and urge the preparation of more bulletins and illustrative material on all phases of home economics.